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Description of a new *Pyrausta* species from East Turkey with comments about related species (Lepidoptera, Pyraloidea)

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Abstract: Description of a new *Pyrausta* species from East Turkey with comments about related species (Lepidoptera, Pyraloidea). *Misc. Pap*. 210: 1-5, 18 figs.
In this paper, a new species *Pyrausta tatarica* **sp. n.** is described and illustrated from Turkey. Holotype of *Pyrausta meciti* is illustrated here for the first time. Genetic distances among various *Panstegia* species are discussed. Genital morphology of males of various *Panstegia* species are illustrated and compared. List of the species of the subgenus *Panstegia* of the genus *Pyrausta* are added.

Key words: *Pyrausta, Panstegia, tatarica, meciti, mauretanica, aerealis, opacalis, limbopunctalis*, Pyraloidea, Lepidoptera, new species, taxonomy, DNA barcode, male genitalia, fauna, Turkey.

"Panstegia meciti" was described by Koçak (1987) from Konya (Ayrancı), based upon a single male and compared with an anatolian *Panstegia aerealis* population. Speidel (1989) pointed out the similarity between *meciti* and *mauretanica*. After Speidel's argument, Slamka (2013) synonymized *meciti* with *mauretanica* from North Africa, without examining the type (Figs. 5, 6). The image of the lectotype of *mauretanica* in "Grigore Antipa", Museul National de Istorie Naturala (Romania, Bucureşti) may be obtained from the following address.[2] Slamka (2013) mentioned also two specimens from Kop Dağı [Bayburt Province, NE Turkey] as "*mauretanica*" but with hesitation. According to Slamka, the nominate subspecies of *aerealis* Hbn. occurs in Central Europe, while southern populations are represented by ssp. *opacalis* Hbn.

As to the DNA barcoding of these populations, 658bp of ssp. *aerealis* and ssp. *opacalis* from various countries are partly available in the Bold Systems. Unfortunately, there is no barcoded material of *mauretanica* from North Africa, with the exception of *meciti* from Turkey. Taking the *aerealis* from Bold Systems, and *meciti* values from Cesa GenBank into consideration, we came to the following conclusions (Kimura, 1980; Ratnasingham & Hebert, 2007; Tamura *et al*., 2013):

Genetic distances between *aerealis* ssp. *aerealis* (ex Germany, Austria, Italy) and Bahçesaray population varies from 2.85% to 3.01%.

Genetic distances between *aerealis* ssp. *opacalis* (ex Spain, France, Macedonia) and Bahçesaray population varies from 2.85% to 3.51%.

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[2] http://clasate.cimec.ro/detaliu.asp?tit=Pyrausta-aerealis-mauretanica--Pyrausta-aerealis-mauretanica-Rebel-1906&k=1288185BE474457E94D50D6DA90DD56F

We hope that this very troubled process, we are experiencing due to the coronavirus pandemic, is over as soon as possible by using the scientific methods not by praying, if it is natural. We wish most of us to return to our happy and healthy days again. The authors

Genetic distance between *meciti* (Holotype) and Bahçesaray population is more than 2%. (for further information, see below).

Taking these results into account, Bahçesaray population cannot be considered as *aerealis*, neither the nominate subspecies, nor ssp. *opacalis*. It cannot be identified as *mauretanica* (its member in Turkey is *meciti*), as well.

Under these circumtances, Bahçesaray population is considered as an undescribed species. This species was previously mentioned by the authors as *Pyrausta aerealis* from Bahçesaray (Kemal & Koçak, 2017: 177). Its description is given below:

***Pyrausta tatarica* sp. n.** **(Figs. 1-4, 7, 11, 15)**

http://zoobank.org/urn:lsid:zoobank.org:act:9CAA9BAC-0F1C-41C9-926F-31B5BF9D16BD

Holotype (♂) (Figs. 1,2). Forewing: 12 mm, wingspan: 24 mm.

Head, labial palpi, proboscis, thorax, legs, dorsal part of antenna covered by short, light brownish scales. Ventral part of filiform antenna ciliated shortly. Abdomen slender with some irregular markings.

Fore-wing: Triangular, costa and dorsum almost straight, termen slightly rounded. Apex pointed. Upperside: Colouration uniformly brownish-olive. Post median transversal band hardly visible. Hind-wing: Paler, submarginal area slightly darker. Antemarginal pale band narrow, incomplete, with several marginal dots. Ciliae dark greyish, uniformly developed. Underside of fore-wing dark, without marking. Hind-wing paler. Submarginal and post median bands slightly darker, yellowish hue more intensive. Marginal dots distinct.

Paratypes (6♂♂) (Figs.3,4): Wing size, colouration and markings similar to holotype. In one paratype, darker and yellowish markings of hind-wing underside better developed (Fig. 4).

Male genitalia (holotype) (Fig. 11): Size slightly smaller than that of other *Panstegia* species (Figs. 11-14). Tegumen broad, uncus broad, rounded at tip. Valva broad rounded at tip. Spiny area at base of valva above sacculus well marked. Fibula well developed. Sacculus, juxta well developed. Saccus small, pointed. Aedeagus long, broad, cylindrical with well developed cluster of cornuti.

Differentiating characters from other species:

New species differs from *aerealis* by wing colourations and markings. Valva of male genitalia is broader than that of *aerealis*. Fibula shorter and its hairiness different (Figs. 11, 13). Shape of juxta, anterior and posterior angles between juxta arms different (Figs. 15, 17). Length and direction of cluster of cornuti different (Figs. 7, 9). Finally, genetic distance between *tatarica* and *aerealis* varies from 2.85 % to 3.51 %.

New species differs from *meciti* by slightly darker hind-wing. Male genitalia smaller. Valva shorter and narrower. Angle between fibula and ventral margin of valva different (Figs. 11, 12). Shape of juxta different. Juxta arms broader in *tatarica*. Shape of angles between juxta arms different (Fig.15, 16). Length of cluster of cornuti different (Figs. 7, 8). Finally, genetic distance between *tatarica* and *meciti* is more than 2% (see also remarks below).

As to *limbopunctalis*, new species is completely different from it both externally and in male genitalia (Figs. 10, 14, 18).

Etymology: After the Crimean Tatars deportation, some groups located at the present territory of southern Van Lake Basin, several thousand kilometers away from their homeland. They named their new settlement as Bahçesaray, like their original city “Bahçesaray” in the Crimea. This new species is therefore dedicated to the deported Tatar people living in Bahçesaray (Van Province).

Type-series: Holotype (♂). East Turkey, Van Province, Bahçesaray, Liman (Spindaran), tragacanthic-malacophyllous mountain steppe, 2320m (65Ac3), 6. viii. 2016, M. Kemal & A. Koçak leg. - 3♂♂ (Paratypes) from same place, 16. vii.2017, M. Kemal & A. Koçak leg. - 3♂♂ (Paratypes). Van Province, Bahçesaray, Krapet Pass 3000m (65Abc), 16. vii. 2017, M. Kemal & A. Koçak leg. (all in coll. Cesa).

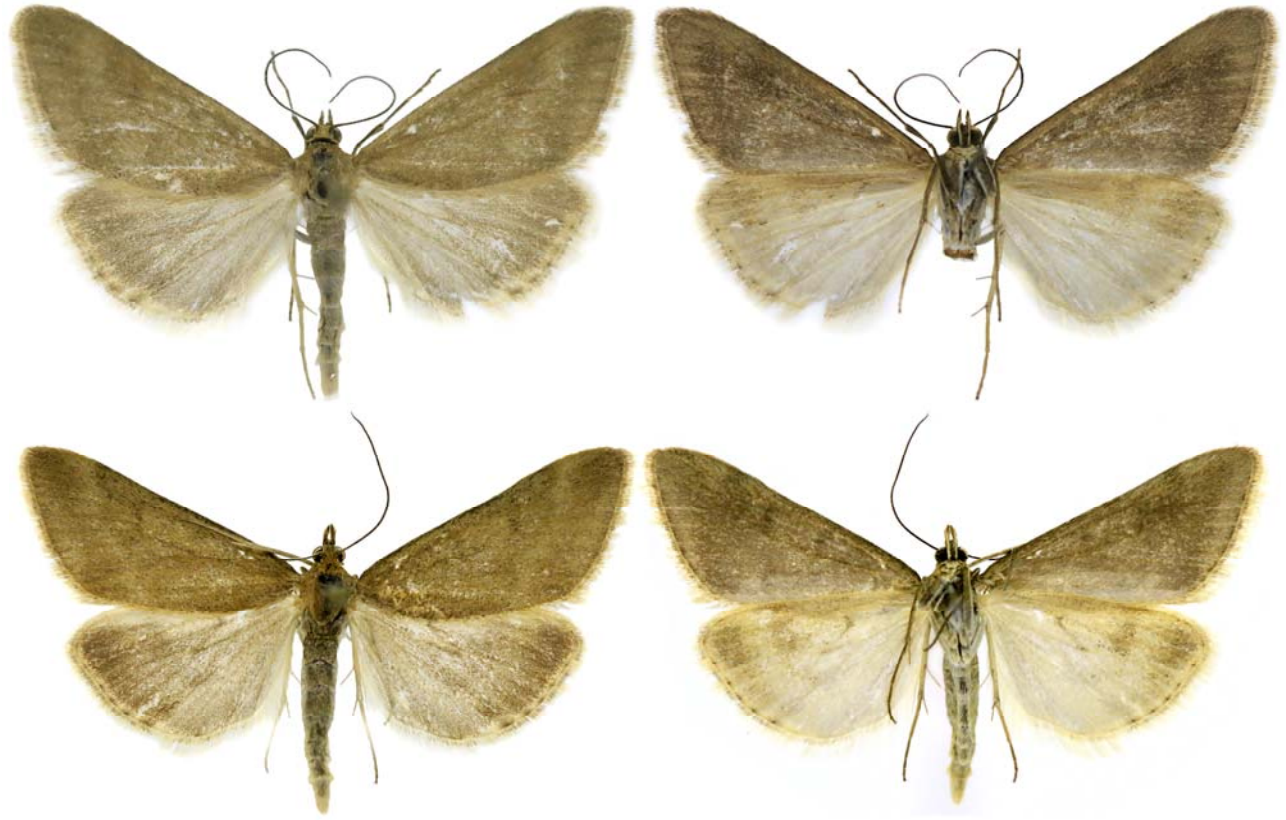
Comparative new material studied: *Pyrausta aerealis*: 1♀. Bitlis Province, Tatvan, Kındras 1760m (13Gd), 31.viii.2013, M. Kemal & A.Koçak leg. – *Pyrausta tatarica*: 1♂. SE Turkey, Hakkari Province, Yüksekova, Dağlıca 2085m (30Df), 22.vi.2017. H.Uçak leg. - *Pyrausta limbopunctalis*: 1♂. SE Turkey, Van Province, Çatak, Saklıvadi 2030m (65Df), 25.vi.2017, M. Kemal & A.Koçak leg.-

3♂. Van Province, Bahçesaray Krapet Pass 2860m, 6.viii.2016, M. Kemal & A.Koçak leg. - 18♂. Bahçesaray, Krapet Pass 3000m, 16.vii.2017, M. Kemal & A.Koçak leg. - 2♂. Van Province, Gürpınar, Başet Mt. 2660-2810m, (65Gü), 6-7.vii.2019, heliophil, M. Kemal & A.Koçak leg. (all in coll. Cesa).

Remarks: The barcode of *P. meciti* (? synonym of *mauretanica*) was a short sequenced than 658 bp (392 bp) so *P. tatarica* and *P. meciti* were compared on a short sequenced level. The genetic distance between the two populations was determined to be greater than 2%. Since the short lengths are compared, we refrain from presenting the net genetic distance value here. However, these genetic signals and morphological supports show that *P. tatarica* is different from *mauretanica*. Within the project of the Cesa[3], The barcoding the *Pyrausta* species in the Cesa Collection is still ongoing.

The present new species *Pyrausta tatarica* was recorded by the accession number: MN640435 in GenBank.

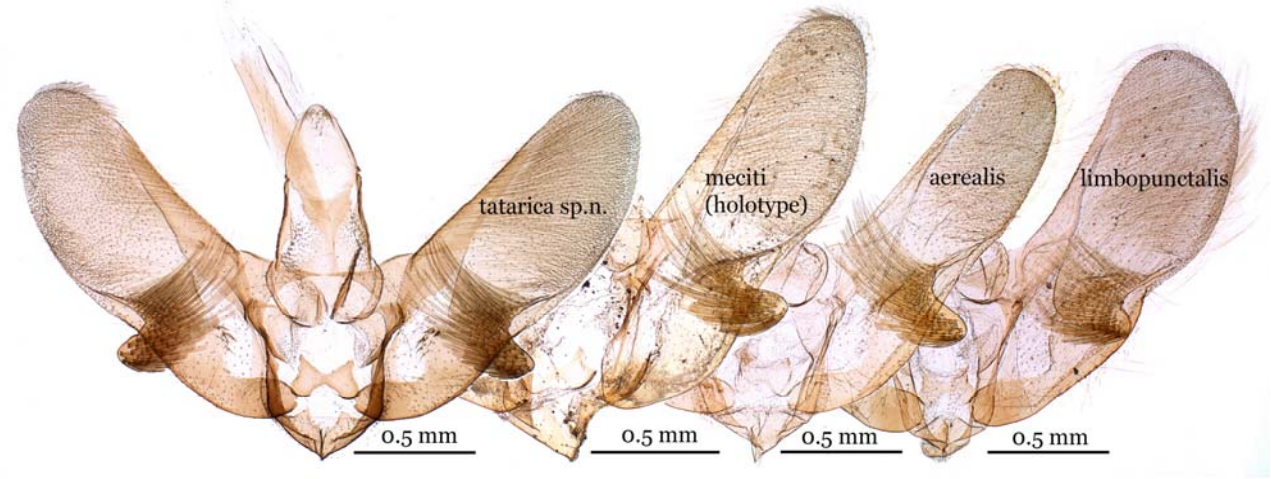
Flight time of the new species and habitat: July- August, yearly in one generation. Alpine tragacanthic-malacophyllous mountain steppe, between 2320-3000m above sea level. Zoogeographically Irano-Turanian element. *Pyrausta (Panstegia) limbopunctalis* is clearly an alpine species (*cf.* Kemal & Koçak, 2013: 17), and it flies together with *tatarica* at some localities.



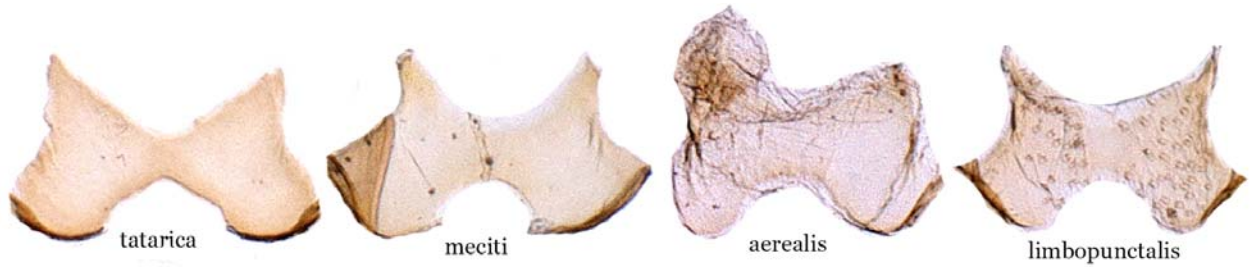
Figs. 1 -4 - *Pyrausta tatarica* **sp. n.** Holotype. Upperside and underside (top). Paratype. Upperside and underside (bottom).

[3] DNA barcoding of the Lepidoptera of the Cesa Collection (DBLCC) (see also Kemal *et al.*, 2020). Holotype of *meciti* and holotype of *tatarica* sp.n. have been barcoded and compared here.

Figs. 5-10 - *Pyrausta meciti* Koçak,1987. Upperside, underside of the holotype and the labels (left). Male genitalia: Aedeagus of various *Pyrausta* species from Turkey: *tatarica* **sp.n.** GP3270 (Holotype) (Van, Bahçesaray), *meciti* GP779 (Holotype) (Konya, Ayrancı, vic. Baraj), *aerealis* GP768 (Konya, Ayrancı: Dikenlidere), *limbopunctalis* GP781 (Niğde, Aladağlar, Cimbar Gorge) (right).



Figs. 11 – 14 – Male genitalia: Valvae of various *Pyrausta* species from Turkey: *tatarica* **sp.n.** GP3270 (Holotype) (Van, Bahçesaray), *meciti* GP779 (Holotype) (Konya, Ayrancı, vic. Baraj), *aerealis* GP768 (Konya, Ayrancı: Dikenlidere), *limbopunctalis* GP781 (Niğde, Aladağlar, Cimbar Gorge). Older genitalic slides (GP779, GP768, GP781) were prepared by A. Koçak in 1985.



Figs. 15 – 18 – Male genitalia: Juxta of various *Pyrausta* species from Turkey: *tatarica* **sp.n.** GP3270 (Holotype) (Van, Bahçesaray), *meciti* GP779 (Holotype) (Konya, Ayrancı, vic. Baraj), *aerealis* GP768 (Konya, Ayrancı: Dikenlidere), *limbopunctalis* GP781 (Niğde, Aladağlar, Cimbar Gorge).

List of the species in the subgenus *Panstegia* of the genus *Pyrausta*.

Genus *Pyrausta* Schrank,1802. Type-species: *Phalaena cingulata* Linnaeus,1758
Subgenus *Panstegia* Hübner,[1825]. Type-species: *Phalaena aerealis* Hübner,1793

aerealis (Hübner,1793): European- Mediterranean element.
ssp. *aerealis* Hübner,1793
ssp. *opacalis* Hübner,[1813]
ssp. *ablutalis* Eversmann,1844
ssp. *cinnamomalis* Zerny,1914
ssp. *glaucalis* Zerny,1914

mauretanica Rebel,1907 **?bona species**
=?*meciti* Koçak,1987
Saharo-Sindian Element.

tatarica **sp.n.**
Irano-Turanian element.

wockei Rebel,1902
Central Asiatic element.

limbopunctalis (Herrich-Schäffer,[1849])
Irano-Turanian element.

Comments: The subspecies of *aerealis* given by Speidel (1989) and Slamka (2013). The taxon *mauretanica* was considered by Leraut (2012: 212) as a distinct species. However, Slamka (2013) omitted this information. We support the new status of *mauretanica*, provided that the genetic distances between *aerealis* from Europe and *mauretanica* from North Africa, as well as between *mauretanica* from North Africa and *meciti* from Turkey are calculated. New localities of "*meciti*" like population, *tatarica* and *aerealis* should be investigated in Turkey faunistically.

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